WHAT IS CLAIMED IS:

1. A network system comprising:

a plurality of networks;

a first internetwork apparatus including a plurality of first ports each connected to said plurality of networks;

a second internetwork apparatus including a plurality of second ports each connected to said plurality of networks; and

data transmission means connected to said first and second internetwork apparatuses to transmit data mutually between said first and second internetwork apparatuses;

wherein

said first internetwork apparatus comprises:

a first transmitting and receiving unit connected to said plurality of first ports and said data transmission means to transmit and receive data mutually among said plurality of first ports and said data transmission means;

a failure detection unit for detecting whether a failure occurs in any of one of said plurality of first ports and a route between one of said plurality of first ports and one of said plurality of networks connected thereto and, when occurrence of a failure is detected, issuing notification indicating a failure occurrence portion to transmit said notification through said first transmitting and receiving unit to said data transmission means; and

a first port control unit for causing each of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks in a normal state and causing said one of said plurality of first ports not to be able to transmit and receive data to and from said one of said plurality of networks in response to detection of occurrence of failure by said failure detection unit; and

said second internetwork apparatus comprises:

a second transmitting and receiving unit connected to said plurality of second ports and said data transmission means for transmitting and receiving data mutually among said plurality of second ports and said data transmission means and for receiving said notification transmitted through said data transmission means to produce said notification; and

a second port control unit for causing said plurality of second ports not to be able to receive data from said plurality of networks and to be able to transmit data to said plurality of networks in the normal state and responsive to said notification from said second transmitting and receiving unit to cause one of said plurality of second ports connected through said one of said plurality of networks to said one of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks.

2. A network system according to Claim 1, wherein

said first port control unit sets an address of each of said plurality of first ports to a common address common to said port and a corresponding one of said plurality of second ports connected through a corresponding one of said plurality of networks in the normal state, said common address being different for each of said plurality of first ports, and

said second port control unit sets an address of each of said plurality of second ports to an address inherent to said port in the normal state.

3. A network system according to Claim 2, wherein

said first port control unit includes means for disconnecting said one of said plurality of first ports from said one of said plurality of networks in response to detection of occurrent of failure by said failure detection unit, and

said second port control unit changes an address of said one of said plurality of second ports from said inherent address to said common address set in said one of said plurality of first ports in response to said notification from said second transmitting and receiving unit.

4. A network system according to Claim 3, wherein

said first port control unit sets an address of said one of said plurality of first ports to an inherent address of said port when said one of said plurality of first ports is restored from failure after said one of said plurality of first ports has been disconnected from said one of said plurality of networks, so that said one of said plurality of first ports can transmit data to said one of said plurality of networks after restoration of failure.

5. A network system according to Claim 1, further comprising:

a management terminal connected to said one of said plurality of networks for managing management information base (MIB) information of each of said plurality of first and second ports;

wherein

said first internetwork apparatus further comprises:

a first MIB information memory unit for storing said management information base information for each of said plurality of first ports; and

a first MIB information control unit connected to said first MIB information memory unit and said first transmitting and receiving unit; and

said second internetwork apparatus further comprises:

a second MIB information memory unit for storing MIB information for each of said plurality of second ports; and

a second MIB information control unit connected to said second MIB information memory unit and said second transmitting and receiving unit;

said management terminal sending a collection request of management information base information of said one of said plurality of first ports through said one of said plurality of networks, said one of said plurality of second ports and said second transmitting and receiving unit to said second MIB information control unit after said one of said plurality of second ports has been caused to be able to transmit and receive data to and from said one of said plurality of networks;

said second MIB information control unit being responsive to said collection request of said management information base information from said management terminal to read out management information base information from said second MIB information memory unit after said one of said plurality of second ports has been caused to be able to transmit and receive data, and sending a collection request of management information base information available before occurrence of failure of said one of said plurality of first ports through said second transmitting and receiving unit, said data transmission means and said first transmitting and receiving unit to said first MIB information control unit;

said first MIB information control unit being responsive to said collection request of management information base information from said second MIB information control unit to read out management information base information available before occurrence of failure of said one of said plurality of first ports from said first MIB information memory unit and transmitting said management information base information through said first transmitting and receiving unit, said data transmission means and said second transmitting and receiving unit to said second MIB information control unit;

said second MIB information control unit calculating a sum total of management information base information read out from said first and second MIB information memory units to send said sum total through said second transmitting and receiving unit, said one of said plurality of second ports and said one of said plurality of networks to said management terminal.

6. A network system comprising:

a plurality of networks;

a first internetwork apparatus including a plurality of first ports each connected to said plurality of networks;

a second internetwork apparatus including a plurality of second ports each connected to said plurality of networks; and

data transmission means connected to said first and second internetwork apparatuses to transmit data mutually between said first and second internetwork apparatuses;

wherein

said first internetwork apparatus comprises:

a first transmitting and receiving unit connected to said plurality of first ports and said data transmission means to transmit and receive data mutually among said plurality of first ports and said data transmission means;

a failure detection unit for detecting whether a failure occurs in any of one of said plurality of first ports and a route between one of said plurality of first ports and one of said plurality of networks connected thereto and, when occurrence of a failure is detected, issuing notification indicating a failure occurrence portion to transmit said notification through said first transmitting and receiving unit to said data transmission means; and

a first port control unit for causing each of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks in a normal state and causing said one of said plurality of first ports not to be able to transmit and receive data to and from said one of said plurality of network in response to detection of occurrence of failure by said failure detection unit; and

said second internetwork apparatus comprises:

a second transmitting and receiving unit connected to said plurality of second ports and said data transmission means for transmitting and receiving data mutually among said plurality of second ports and said data transmission means and for receiving said notification transmitted through said data transmission means to produce said notification; and

a second port control unit for causing each of said plurality of second ports not to be able to transmit and receive data from and to one of said plurality of networks connected to said each port of said plurality of second ports in the normal state and responsive to said notification from said second transmitting and receiving unit to cause one of said plurality of second ports connected through said one of said plurality of networks to said one of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks.

7. A network system according to Claim 6, wherein

said first port control unit sets an address of each of said plurality of first ports to a common address common to said port and a corresponding one of said plurality of second ports connected through a corresponding one of said plurality of networks in the normal state, said common address being different for each of said plurality of first ports, and

said second port control unit does not set an address of each of said plurality of second ports in the normal state.

8. A network system according to Claim 7, wherein

said first port control unit includes means for disconnecting said one of said plurality of first ports from said one of said plurality of networks in response to detection of occurrent of failure by said failure detection unit, and

said second port control unit changes an address of said one of said plurality of second ports to said common address set in said one of said plurality of first ports in response to said notification from said second transmitting and receiving unit.

9. A network system according to Claim 8, wherein

said first port control unit deletes an address of said one of said plurality of first ports when said one of said plurality of first ports is restored from failure after said one of said plurality of first ports has been disconnected from said one of said plurality of networks.

10. A network system according to Claim 6, further comprising:

a management terminal connected to said one of said plurality of networks for managing management information base (MIB) information of each of said plurality of first and second ports;

wherein

said first internetwork apparatus further comprises:

a first MIB information memory unit for storing MIB information for each of said plurality of first ports; and

a first MIB information control unit connected to said first MIB information memory unit and said first transmitting and receiving unit; and

said second internetwork apparatus further comprises:

a second MIB information memory unit for storing MIB information for each of said plurality of second ports; and

a second MIB information control unit connected to said second MIB information memory unit and said second transmitting and receiving unit;

said management terminal sending a collection request of management information base information of said one of said plurality of first ports through said one of said plurality of networks, said one of said plurality of second ports and said second transmitting and receiving unit to said second MIB information control unit after said one of said plurality of second ports has been caused to be able to transmit and receive data to and from said one of said plurality of networks;

said second MIB information control unit being responsive to said collection request of MIB information from said management terminal to read out management information base information from said second MIB information memory unit after said one of said plurality of second ports has been caused to be able to transmit and receive data, and sending a collection request of management information base information available before occurrence of failure of said one of said plurality of first ports through said second transmitting and receiving unit, said data transmission means and said first transmitting and receiving unit to said first MIB information control unit;

said first MIB information control unit being responsive to said collection request of management information base information from said second MIB information control unit to read out management information base information available before occurrence of failure of said one of said plurality of first ports from said first MIB information memory unit and transmitting said management information base information through said first transmitting and receiving unit, said data transmission means and said second transmitting and receiving unit to said second MIB information control unit;

said second MIB information control unit calculating a sum total of management information base information read out from said first and second MIB information memory units to send said sum total through said second transmitting and receiving unit, said one of said plurality of second ports and said one of said plurality of networks to said management terminal.

11. A failure restoration method in a network system including a plurality of networks, a first internetwork apparatus having a plurality of first ports each connected to said plurality of networks, a second internetwork apparatus having a plurality of second ports each connected to said plurality of networks, and data

transmission means connected to said first and second internetwork apparatuses to transmit data mutually between said first and second internetwork apparatuses, data being transmitted and received mutually among said plurality of first ports and said data transmission means and among said plurality of second ports and said data transmission means, comprising the steps of:

causing each of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks in a normal state;

causing said plurality of second ports not to be able to receive data from said plurality of networks and to be able to transmit data to said plurality of networks in the normal state;

detecting whether a failure occurs in any of one of said plurality of first ports and a route between one of said plurality of first ports and one of said plurality of networks connected thereto;

causing said one of said plurality of first ports not to be able to transmit and receive data to and from said one of said plurality of networks in response to said detection of occurrence of failure; and

causing one of said plurality of second ports connected to said one of said plurality of first ports through said one of said plurality of networks to be able to transmit and receive data to and from said one of said plurality of networks in response to said detection of occurrence of failure.

12. A failure restoration method in a network system including a plurality of networks, a first internetwork apparatus having a plurality of first ports each connected to said plurality of networks, a second internetwork apparatus having a plurality of second ports each connected to said plurality of networks, and data transmission means connected to said first and second internetwork apparatuses to transmit data mutually between said first and second internetwork apparatuses, data being transmitted and received mutually among said plurality of first ports and said data transmission means and among said plurality of second ports and said data transmission means, comprising the steps of:

causing each of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks in a normal state;

causing said plurality of second ports not to be able to transmit and receive data to and from said plurality of networks in the normal state;

detecting whether a failure occurs in any of one of said plurality of first ports and a route between one of said plurality of first ports and one of said plurality of networks connected thereto;

causing said one of said plurality of first ports not to be able to transmit and receive data to and from said one of said plurality of networks in response to said detection of occurrence of failure; and causing one of said plurality of second ports connected to said one of said plurality of first ports through said one of said plurality of networks to be able to transmit and receive data to and from said one of said plurality of networks in response to said detection of occurrence of failure.

13. A computer program embodied on a computer-readable medium for use in a network system including a plurality of networks, a first internetwork apparatus having a plurality of first ports each connected to said plurality of networks, a second internetwork apparatus having a plurality of second ports each connected to said plurality of networks, and data transmission means connected to said first and second internetwork apparatuses to transmit data mutually between said first and second internetwork apparatuses, data being transmitted and received mutually among said plurality of first ports and said data transmission means and among said plurality of second ports and said data transmission means, comprising:

program code means for causing each of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks in a normal state;

program code means for causing said plurality of second ports not to be able to receive data from said plurality of networks and to be able to transmit data to said plurality of networks in the normal state;

program code means for detecting whether a failure occurs in any of one of said plurality of first ports and a route between one of said plurality of first ports and one of said plurality of networks connected thereto;

program code means for causing said one of said plurality of first ports not to be able to transmit and receive data to and from said one of said plurality of networks in response to said detection of occurrence of failure; and

program code means for causing one of said plurality of second ports connected to said one of said plurality of first ports through said one of said plurality of networks to be able to transmit and receive data to and from said one of said plurality of networks in response to said detection of occurrence of failure.

14. A computer program embodied on a computer-readable medium for use in a network system including a plurality of networks, a first internetwork apparatus having a plurality of first ports each connected to said plurality of networks, a second internetwork apparatus having a plurality of second ports each connected to said plurality of networks, and data transmission means connected to said first and second internetwork apparatuses to transmit data mutually between said first and second internetwork apparatuses, data being transmitted and received mutually among said plurality of first ports and said data transmission means and among said

plurality of second ports and said data transmission means, comprising:

program code means for causing each of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks in a normal state;

program code means for causing said plurality of second ports not to be able to transmit and receive data to and from said plurality of networks in the normal state;

program code means for detecting whether a failure occurs in any of one of said plurality of first ports and a route between one of said plurality of first ports and one of said plurality of networks connected thereto;

program code means for causing said one of said plurality of first ports not to be able to transmit and receive data to and from said one of said plurality of networks in response to said detection of occurrence of failure; and

program code means for causing one of said plurality of second ports connected to said one of said plurality of first ports through said one of said plurality of networks to be able to transmit and receive data to and from said one of said plurality of networks in response to said detection of occurrence of failure.

15. A network system comprising:

a plurality of networks;

a first internetwork apparatus including a plurality of first ports each connected to said plurality of networks;

a second internetwork apparatus including a plurality of second ports each connected to said plurality of networks;

data transmission means connected to said first and second internetwork apparatuses to transmit data mutually between said first and second internetwork apparatuses; and

a management terminal connected to any one of said plurality of networks for managing management information base (MIB) information of each of said plurality of first and second ports;

wherein

said first internetwork apparatus comprises:

a first transmitting and receiving unit connected to said plurality of first ports and said data transmission means to transmit and receive data mutually among said plurality of first ports and said data transmission means;

a failure detection unit for detecting whether a failure occurs in any of one of said plurality of first ports and a route between one of said plurality of first ports and one of said plurality of networks connected thereto and, when occurrence of a failure is detected, issuing notification indicating a failure occurrence portion to transmit said notification through said first transmitting and receiving unit to said data transmission means;

a first port control unit for causing each of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks in a normal state and causing said one of said plurality of first ports not to be able to transmit and receive data to and from said one of said plurality of networks in response to detection of occurrence of failure by said failure detection unit, said first port control unit setting an address of each of said plurality of first ports to a common address common to said port and a corresponding one of said plurality of second ports connected through a corresponding one of said plurality of networks in the normal state, said common address being different for each of said plurality of first ports;

a first MIB information memory unit for storing MIB information for each of said plurality of first ports; and

a first MIB information control unit connected to said first MIB information memory unit and said first transmitting and receiving unit; and

said second internetwork apparatus comprises:

a second transmitting and receiving unit connected to said plurality of second ports and said data transmission means for transmitting and receiving data mutually among said plurality of second ports and said data transmission means and for receiving said notification transmitted through said data transmission means to produce said notification;

a second port control unit for causing said plurality of second ports not to be able to receive data from said plurality of networks and to be able to transmit data to said plurality of networks in the normal state and responsive to said notification from said second transmitting and receiving unit to cause one of said plurality of second ports connected through said one of said plurality of networks to said one of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks, said second port control unit setting an address of each of said plurality of second ports to an address inherent to said port in the normal state;

a second MIB information memory unit for storing MIB information for each of said plurality of second ports; and

a second MIB information control unit connected to said second MIB information memory unit and said second transmitting and receiving unit;

said management terminal issuing a collection request of management information base information to one of said common addresses;

one of said plurality of first ports including said one of said common addresses receiving collection request of management information base information from said management terminal and sending the received collection request to said first MIB information control unit;

said first MIB information control unit being responsive to collection request of management information base information from said management terminal to read out management information base information corresponding to said one of said common addresses from said first MIB information memory and sending a collection request of management information base information for one of said plurality of second ports including said one of said common address through said first transmitting and receiving unit, said data transmission means and said second transmitting and receiving unit to said second MIB information control unit;

said second MIB information control unit being responsive to said collection request of management information base information from said first MIB information control unit to read out management information base information corresponding to said one of said common addresses from said second MIB information memory unit and sending the management information base information through said second transmitting and receiving unit, said data transmission means and said first transmitting and receiving unit to said first MIB information control unit;

said first MIB information control unit calculating a sum total of the management information base information read out from said first and second MIB information memory units to send the sum total through said first transmitting and receiving unit and said one of said plurality of first ports including said one of said common addresses to said management terminal.

16. A network system comprising:

a plurality of networks;

a first internetwork apparatus including a plurality of first ports each connected to said plurality of networks;

a second internetwork apparatus including a plurality of second ports each connected to said plurality of networks;

data transmission means connected to said first and second internetwork apparatuses to transmit data mutually between said first and second internetwork apparatuses; and

a management terminal connected to any one of said plurality of networks for managing management information base (MIB) information of each of said plurality of first and second ports;

wherein

said first internetwork apparatus comprises:

a first transmitting and receiving unit connected to said plurality of first ports and said data transmission means to transmit and receive data mutually among said plurality of first ports and said data transmission means;

a failure detection unit for detecting whether a failure occurs in any of one of said plurality of first ports and a route between one of said plurality of first ports and one of said plurality of networks connected thereto and, when occurrence of a failure is detected, issuing notification indicating a failure occurrence portion to transmit said notification through said first transmitting and receiving unit to said data transmission means;

a first port control unit for causing each of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks in a normal state and causing said one of said plurality of first ports not to be able to transmit and receive data to and from said one of said plurality of networks in response to detection of occurrence of failure by said failure detection unit, said first port control unit setting an address of each of said plurality of first ports to a common address common to said port and a corresponding one of said plurality of second ports connected through a corresponding one of said plurality of networks in the normal state, said common address being different for each of said plurality of first ports;

a first MIB information memory unit for storing MIB information for each of said plurality of first ports; and

a first MIB information control unit connected to said first MIB information memory unit and said first transmitting and receiving unit; and

said second internetwork apparatus comprises:

a second transmitting and receiving unit connected to said plurality of second ports and said data transmission means for transmitting and receiving data mutually among said plurality of second ports and said data transmission means and for receiving said notification transmitted through said data transmission means to produce said notification;

a second port control unit for causing each of said plurality of second ports not to be able to transmit and receive data to and from one of said plurality of networks in the normal state and responsive to said notification from said second transmitting and receiving unit to cause one of said plurality of second ports connected through said one of said plurality of networks to said one of said plurality of first ports to be able to transmit and receive data to and from said one of said plurality of networks, said second port control unit not setting an address of each of said plurality of second ports in the normal state;

a second MIB information memory unit for storing MIB information for each of said plurality of second ports; and

a second MIB information control unit connected to said second MIB information memory unit and said second transmitting and receiving unit;

said management terminal issuing a collection request of management information base information to one of said common addresses;

one of said plurality of first ports including said one of said common addresses receiving the collection request of the management information base information from said management terminal and sending the received collection request to said first MIB information control unit;

said first MIB information control unit being responsive to the collection request of the management information base information from said management terminal to read out management information base information corresponding to said one of said common addresses from said first MIB information memory unit and sending a collection request of management information base information for one of said plurality of second ports including said one of said common address through said first transmitting and receiving unit, said data transmission means and said second transmitting and receiving unit to said second MIB information control unit;

said second MIB information control unit being responsive to the collection request of the management information base information from said first MIB information control unit to read out management information base information corresponding to said one of said common addresses and sending the management information base information through said second transmitting and receiving unit, said data transmission means and said first transmitting and receiving unit to said first MIB information control unit;

said first MIB information control unit calculating a sum total of the management information base information read out from said first and second MIB information memory units to send the sum total through said first transmitting and receiving unit and said one of said plurality of first ports including said one of said common addresses to said management terminal.